

Closing in on Closure

100 DR-5 groundwater treatment system expands

The Site's Groundwater Remediation Project (GRP), managed by Fluor Hanford, has expanded pump-and-treat systems to remediate plumes of contaminated water under the DR-5 sector – the center portion – of the 100-D Area. This sector, a swath just northwest and slightly upstream from the cocooned D and DR Reactors, contains plumes with the highest concentrations of hexavalent chromium anywhere on the Hanford Site. Hexavalent chromium, also called "chromium-six," can harm juvenile salmon.

Remediating groundwater containing hexavalent chromium in the northern "horn" of the Hanford Site, in and around 100-D and 100-H Areas, has long been a goal of the GRP. Pump-and-treat systems have operated in the 100-D Area for more than eight years, processing nearly 350 million gallons of groundwater and removing nearly 600 pounds of hexavalent chromium. Additionally, a passive, underground chemical-barrier system has been treating groundwater contaminated with hexavalent chromium in the 100-D Area since 1999. Groundwater remediation systems serving the 100-H Area have been so successful that next year they may meet the Interim Action goal of 20 parts per billion (ppb) of chromium—a goal set by the Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology).

In 2004, new and more concentrated groundwater plumes were detected northwest of the D and DR Reactors, in an area known as the 100-DR-5 region. Hexavalent chromium in these plumes was measured at up to 3,000 ppb. The drinking water standard established by the U.S. EPA is 100 ppb, while the even more restrictive aquatic standard, considered healthy for

fish, is 10 ppb. The remedial objective of 20 ppb is defined in a Record of Decision for the compliance wells in the area, and signed by the DOE, EPA and Ecology.

According to Ron Jackson, task leader for groundwater remediation in the 100-H and 100-D Areas, pumping efforts in the 100-D Area have ramped up aggressively to address the new plumes. Now, with the addition of another pump-and-treat system that uses new and more efficient

the new treatment system in an expedited manner. "We're especially hopeful about the new resins just placed into the treatment system," said Isaacs. "We now have resins that can be regenerated or cleaned here on Site, which could greatly reduce our operating costs. Also, our treatment capacity is now up to nearly 50 gallons per minute, so we can maintain progress against any movement by this plume."

Jackson noted that "one of the biggest challenges is to find the source of the new, highly concentrated plume." It is known that sodium dichromate was added to cooling water pumped through Hanford's reactors during plutonium production. The sodium dichromate helped prevent excessive corrosion in the reactors' process tubes. However, spills of highly concentrated "stocks" of sodium dichromate, as well as leakage of coolant water, left a messy trail of contaminated groundwater, especially in the middle reactor areas (K, D and H Areas). Now, GRP scientists pinpoint the underground pathways that cause the chromium-six plumes to concentrate and flow in specific locations.

All of the systems treating hexavalent chromium in Hanford's 100 Areas operate to bind with chromium-six (hexavalent chromium) and change it to chromium-three (trivalent chromium). While hexavalent chromium is soluble in water and harmful to living organisms, trivalent chromium is not water-soluble, but is stable and much less harmful than chromium in the hexavalent form. "Our goal," says Jackson, "is to fully cover and

address the plumes that emerge, find the most efficient and effective means to do that, and thereby protect the important fish habitat in the Columbia River near the 100 Areas."

Michele Gerber, Communications

File Photos



The 100-D Area is pictured during operations in 1956 (top) and during cleanup in 2001 (bottom).

resins to treat the contaminant, the GRP is better able to capture the highly concentrated plume before it reaches the Columbia River.

Chief Engineer Jerry Isaacs and his design team played key roles in implementing